

CLAIMS

1. An isolated polynucleotide selected from the group consisting of
 - (a) a polynucleotide comprising a coding region of the nucleotide sequence set forth in any one of the following SEQ ID NOS:
5 SEQ ID NO: 1, 3, 5, and 7;
(b) a polynucleotide comprising a nucleotide sequence encoding a protein comprising the amino acid sequence set forth in any one of the following SEQ ID NOS:
SEQ ID NO: 2, 4, 6, and 8;
(c) a polynucleotide comprising a nucleotide sequence encoding a protein comprising 10 an amino acid sequence selected from the amino acid sequences of (b), in which one or more amino acids are substituted, deleted, inserted, and/or added, wherein said protein is functionally equivalent to the protein comprising said amino acid sequence selected from the amino acid sequences of (b);
(d) a polynucleotide that hybridizes with a polynucleotide comprising a nucleotide sequence selected from the nucleotide sequences of (a), and that comprises a nucleotide sequence encoding a protein functionally equivalent to the protein encoded by the nucleotide sequence selected from the nucleotide sequences of (a);
(e) a polynucleotide comprising a nucleotide sequence encoding a partial amino acid sequence of a protein encoded by the polynucleotide of (a) to (d);
20 (f) a polynucleotide comprising a nucleotide sequence with at least 70% identity to the nucleotide sequence of (a).
2. A substantially pure protein encoded by the polynucleotide of claim 1.
3. A partial peptide of the protein of claim 2.
4. An antibody against the protein of claim 2 or the peptide of claim 3.
- 25 5. A vector comprising the polynucleotide of claim 1.
6. A transformant carrying the polynucleotide of claim 1 or the vector of claim 5.
7. A transformant expressively carrying the polynucleotide of claim 1 or the vector of claim 5.
8. A method for producing the protein of claim 2 or the peptide of claim 3, comprising 30 culturing the transformant of claim 7 and recovering the expression product.
9. An oligonucleotide comprising the nucleotide sequence of claim 1 (a) or the nucleotide sequence complementary to the complementary strand thereof, wherein said oligonucleotide comprises 15 nucleotides or more.
10. Use of the oligonucleotide of claim 9 as a primer for synthesizing a polynucleotide.
- 35 11. Use of the oligonucleotide of claim 9 as a probe for detecting a gene.
12. An antisense polynucleotide against the polynucleotide of claim 1, or the portion

thereof.

13. A method for synthesizing a polynucleotide, the method comprising:
 - a) synthesizing a complementary strand using a cDNA library as a template, and using the primer of claim 10; and
 - 5 b) recovering the synthesized product.
14. The method of claim 13, wherein the cDNA library is obtainable by oligo-capping method.
15. The method of claim 13, wherein the complementary strand is obtainable by PCR.
16. A method for detecting the polynucleotide of claim 1, the method comprising:
 - 10 a) incubating a target polynucleotide with the oligonucleotide of claim 9 under the conditions where hybridization occurs, and
 - b) detecting the hybridization of the target polynucleotide with the oligonucleotide of claim 9.